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November 3, 2009

Re: Docket No. 2009-0108; In re Public Utilities Commission Instituting a Proceeding to Investigate Proposed Amendments to the Framework for Integrated Resource Planning

To: Service List

In the Order Approving the Stipulated Procedural Order, as Modified, filed on September 23, 2009 ("Order"), the Commission stated that its consultant, the National Regulatory Research Institute ("NRRI"), would be providing comments on clean energy scenario planning. Consistent with the Order, enclosed is NRRI's paper titled "Clean Energy Scenario Planning: Thoughts on Creating a Framework."

Sincerely,

Carlito P. Caliboso
Chairman

CPC:cp

Enclosure

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Clean Energy Scenario Planning: Thoughts on Creating a Framework

Presented to the Hawaii Public Utilities Commission

Docket No. 2009-0108

David Magnus Boonin, Principal

November 3, 2009

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Clean Energy Scenario Planning:

Thoughts on Creating a Framework

In 1992, the Hawaii Public Utilities Commission issued an order establishing a framework for integrated resource planning.[1] The goal of integrated resource planning, as stated in the 1992 Framework (Section 2.a), is the "identification of the resources or the mix of resources for meeting near and long term consumer energy needs in an efficient and reliable manner at the lowest reasonable cost." In the last few years, the State has broadened its priorities beyond "consumer energy needs." Reduction in fossil fuel dependency is now an urgent high priority. The State has reiterated this goal through legislation, orders, and agreements. To achieve the goal, the State has enlisted multiple entities - the Governor's office, the Department of Business and Economic Development, the Public Utilities Commission, the Consumer Advocate, the utilities, the United States Department of Energy, a new Public Benefits Fee Administrator, private consultants, and new developers of renewable energy.

On April 28, 2009, the HECO Companies, KIUC, and the Consumer Advocate requested that the Commission open an investigatory docket to review and establish a Clean Energy Scenario Planning Framework (CESP Framework) that revises the previous IRP Framework. As the Commission and the parties before it have recognized, the breadth of the State's new goal, and the complexity of organizing multiple efforts and multiple priorities, warrants reconsideration of the 1992 Framework. While the parties have diligently sought to revise the document to reflect the new issues, deeper questions exist. Is integrated resource planning (IRP), whether or not updated, a sufficient process for achieving the state's needs, or is something more needed? This paper attempts to answer that question.

The paper asserts that the concept of "scenario planning" is the correct response to the state's challenges. Scenario planning differs from IRP. IRP identifies least-cost resources to meet a small band of pre-determined trends or forecasts. Scenario planning identifies different views of the future, then seeks policies and resources that are reasonably successful under all or most of those futures. This paper explores this difference, then describes the basic steps of scenario planning. It asserts that scenario planning is sufficiently different from traditional integrated resource planning and that its successful implementation requires more than editing the 1992 document. While there is certainly a role for integrated resource planning, and while the parties' attempt to edit the 1992 Framework to connect it better to 2010 priorities certainly has merit, that attempt by itself will not prepare Hawaii for the range of uncertainties ahead.

The purpose of this paper is not to critique the parties' editing of the 1992 document but to recommend a predecessor step: to define "scenario planning," distinguish it from integrated

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[1] Decision and Order No. 11523, filed on March 12, 1992, as amended by Decision and Order No. 11630, filed on May 22, 1992, in Docket No. 6617.

resource planning, then invite the parties to Docket No. 2009-0108 to apply this new concept to the State's urgent needs. The paper does so by asking three main questions:

1. What is scenario planning and how does it differ from integrated resource planning?

2. What are the main steps in a CESP framework?

3. Who are the appropriate participants in a CESP development process?

While part of the discussion is necessarily conceptual, the paper also seeks to apply the concepts to Hawaii's clean energy goals. To that end, we list in Appendix C questions intended to stimulate the parties to apply the concepts. We envision a process by which (a) the parties comment on this paper by November 20, 2009; (b) the parties respond to these questions in their Final Statements of Position, presently due on December 21, 2009; and (c) the Commission's hearing in the week of February 8, 2010 assists the parties in identifying a framework for scenario planning in the manner discussed in this paper. That process will give the Commission and the parties more insight as to whether and how to convert the 1992 IRP principles and processes into a true process for clean energy scenario planning.

I. What is Scenario Planning? How Does It Differ From Integrated Resource Planning?

A. A close-to-home analogy

Home buying is a useful way to distinguish scenario planning from integrated resource planning. Consider a young couple planning to buy a house that they intend to live in for the next thirty years. They could look at appreciation trends, maintenance costs, and demographic and economic trends in the neighborhood, then choose the least-cost three-bedroom house based upon a single view of the future. That effort resembles integrated resource planning: finding the least-cost solution for a defined need. But what if the "defined need" is not well defined? What if the couple changed their planning mindset and asked what house would work best under widely different views of the future? What if they were to have lots of children, or none? What if one spouse got a better job on the other side of town? What if one spouse became infirm and could not climb stairs?

Under the single view of the future, the most economical solution ensures a good answer under only one scenario (limited number of children, working in the same area, remaining healthy). That most economical solution would become suboptimal if the facts turn out differently. If triplets arrive, it might be infeasible to expand the house; if infirmity arrives, it might be infeasible to eliminate the stairs; if the job changes, the transportation options might be poor.

Now assume that the couple, before buying, had expanded its scenario to include all of the above. They might then find that their best solution was a three-bedroom house with expansion possibilities, near multiple transportation modes, offering the ability to live on one

level. The housing search and decision would be much different. The housing choice might not be the most economic under any *one* of the plausible scenarios, but it would reduce or eliminate the risk that the choice would leave the buyers unable to live comfortably under one or more scenarios. This seemingly suboptimal solution might be the best one because it would reasonably meet the couple's housing needs regardless of which scenario became reality.

This close-to-home analogy helps illustrate the distinction we wish to draw between 1992 integrated resource planning and 2010 clean energy scenario planning. The single-future view with a least-cost-centric solution resembles the integrated resource planning (IRP) used by many utilities.[2] Although IRP looks at different trends in fuel prices and load growth, it seldom looks at widely different future scenarios, where those scenarios flow from events beyond the utility's (or anyone's) control. Scenario planning looks at uncertainties that drive widely different futures, then seeks solutions that work well under all those different futures, even if the solution is not optimal for any particular scenario.

B. Scenario planning's purpose

> "Experience has taught us that the scenario technique is much more conducive to forcing people to think about the future than the forecasting techniques we formerly used."
>
> "A willingness to face uncertainty and understand the forces driving it requires an almost revolutionary transformation in a large organization. This transformation is as important as the development of scenarios themselves."[3]

Scenario planning is necessitated by uncertainties. Examples of uncertainties are a sea change in environmental policy, a major technological innovation (e.g., a battery breakthrough that makes electricity storage and electric vehicles vastly more deployable than they are under current technology); or a government decision to prohibit—or rely entirely—on a particular fuel source.

Scenario planning does not identify the most likely future. Its purpose instead is to (a) acknowledge that uncertainties can drive the future onto very different paths, and then (b) examine those uncertainties and paths. Scenario planning is not forecasting; thus it is not traditional IRP. Like war games for business or government decisions, scenario planning allows

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[2] Because we have not worked within the Hawaii IRP process, we do not mean our broad-brush statement to apply fully to Hawaii. Although least-cost solutions are the focus of IRP, planning decisions under IRP sometimes deviate from a pure least-cost solution. It is for the Hawaii-experienced readers to determine how well the shoe fits.

[3] These comments come from former executives of Shell Oil Company. See P. Wack, "Uncharted Waters Ahead," *Harvard Business Review*, September-October 1985. Scenario planning was adapted as a business-planning tool in the 1970s by Shell Oil. According to one Shell executive, scenario planning helped turn Shell from a second-tier player in the oil industry to an industry leader, because its planning allowed it to respond differently from other oil companies during the oil crises of the 1970s and early 1980s.

decisionmakers to examine several scenarios and strategies, with the goal of accommodating multiple results and avoiding disastrous results. Scenario planning allows decisionmakers to rehearse the future and identify low-risk responses.

Scenario planning is only as good as the scenarios created and used. Well-designed scenarios define plausible, internally consistent views of the future. These alternatives go far beyond the sensitivity analyses deployed in traditional IRP. IRP chooses a single future (e.g., electric vehicles will not be an attractive technology over the planning horizon and plasma televisions will become the industry standard). Planners perform sensitivity analyses on such trends as fuel prices, carbon costs, and economic conditions. IRP does not generally examine more than this one future. It does not ask, "What if electric cars become everyone's second car?" or "What if there is a breakthrough in solar technology that makes small systems as cost-effective as new centralized biomass-fired facilities or cabled big wind?"

The chosen scenarios must help decisionmakers make regret-free choices. Unlike IRP, which focuses on selecting a resource solution that minimized costs under a single scenario, scenario planning enables decisionmakers to make resource or policy decisions that provide good results under a wide range of scenarios. Scenario planning requires the participants to define futures that IRP does not consider. This step requires that planners describe uncertainties outside of the utility's control, as part of a process of identifying and describing all plausible futures. As compared to IRP, the core questions are different, the planning process is different, and the decision metrics are different. The table below summarizes some of the differences between IRP and scenario planning.

Integrated Resource Planning Compared to Scenario Planning		
	Integrated Resource Planning	**Scenario Planning**
What is the question?	What is the optimal mix of particular supply and demand resources to provide a least-cost resource mix to serve expected load under a particular view of the future? Note that this is an optimization approach to resource planning.	What collection of resources allows the utility to meet its load under a set of scenarios that define a broad set of plausible futures? Note that this is more of a risk management approach to resource planning.
What is the view of the future?	Utility uses a single forecast or a set of forecasts to portray the future.	The plausible futures are diverse scenarios based upon key uncertainties. There is no single forecast driving the planning process.
What is the focus?	The focus is on the cost of different technologies and sensitivity analysis.	The focus is on identifying key uncertainties that define plausible scenarios.
What is the preferred resource?	Preferred resources are the least-cost mix of resources to meet a particular view of the future as tested under sensitivity analysis.	Preferred resources are a set of resources that provide a reasonable regret-free solution under widely different views of the future.

C. How do planners develop useful scenarios?

Scenario planners emphasize uncertainties—uncertainties outside their control. Scenarios are not forecasts. They are provocative and plausible accounts of how relevant externally driven forces might interact. Scenarios provide decisionmakers with different visions of challenges and opportunities.

Scenario planning starts by distinguishing ***uncertainties*** from ***trends*** and ***expected events***. ***Trends***, while uncertain in outcome, reflect known facts subject to gradual change (e.g., probable load growth without further demand-side resources). Examples of ***expected events*** are known technologies that remain in the testing stage but will become commercial. ***Uncertainties***, in contrast, are unexpected because they depart from trends and expected events. The process initially focuses on obvious uncertainties, producing scenarios useful in gaining a general understanding of the situation. These "first-generation scenarios" do not help make resource

decisions. Resource decisions are possible only after the participants, often aided by an experienced facilitator, apply iterative refinements that make the scenarios useful for decisionmaking. Experience indicates that it is almost impossible to jump directly to proper decision scenarios without starting with obvious scenarios. In Hawaii, planners might first identify an uncertainty about interest rates, only to discover that, when placed into the context of Hawaii's clean energy initiatives, interest rates were not a key driver of plausible scenarios. Similarly, planners might identify a change in electric vehicle technology as a key uncertainty, then find they must investigate and refine that general uncertainty with ideas consistent with improved electric car technology (e.g., cheaper batteries or the need for a new infrastructure to support electric cars).

To develop scenarios that help decisionmaking, we need to identify the uncertainties that are ***driving forces***—uncertainties that make a **significant difference to a scenario's story**. The recurring question in the scenario development process is: Does this uncertainty make a difference? Examples: Will the next election make a difference? Would a change in tax credits make a difference?

The set of scenarios should define all plausible futures. Effective scenario planning focuses on a relatively small set of scenarios, creatively established. Two views of future federal environmental policy and two views of electric vehicle technology create four scenarios, if we combine each member of one pair with each member of the other pair. Planners and decisionmakers can view these scenarios in a 2X2 matrix. Add another binary pair of futures (e.g., the cost of solar power is equal to the cost of wind vs. solar remaining more expensive than wind), and there are now eight scenarios. Planners can organize these eight scenarios with a three-dimensional 2X2X2 matrix. If the analyst can think in three dimensions, she can consider eight scenarios. According to existing research[4], those three dimensions and eight scenarios represent the practical limit for scenario planning that is efficient and transparent.[5]

To keep the number of scenarios small but the scope broad, it might become necessary to define a driver broadly (e.g., the cost of wind and solar are both less than the cost of new oil generation rather than only one renewable resource being more economic than oil). What scenarios are applicable to Hawaii's CESP will emerge if we follow the planning steps described at Part II. Typically, one of the scenarios defaults to a surprise-free scenario (i.e., the scenario that was implicit to the IRP process), providing decisionmakers with an IRP-like forecast.

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[4] See P. Wack, "Uncharted Waters Ahead," *Harvard Business Review*, September-October 1985; and "Scenario Planning" at www.NetMBA.com.

[5] There are techniques for considering more than three sets of binary uncertainties. Planners can develop scenarios driven by more than one uncertainty, such as a federal energy policy that both reduces the cost of a technology and improves the technology. Planners can also compare two sets of binary choices without adding or considering other identified drivers.

II. What Are the Main Steps in Applying a CESP Framework?

> "Scenario thinking is both a process and a posture. It is the process through which scenarios are developed and then used to inform decisionmaking. After that process itself is internalized, scenario thinking becomes, for many, a posture towards the world—a way of thinking about and managing change, a way of exploring the future so that they might meet it better prepared. At its most basic, scenarios help people and organizations order and frame their thinking about the long-term while providing them with the tools and confidence to take action soon. At its most powerful, scenarios help people and organizations find strength of purpose and strategic direction in the face of daunting, chaotic, and even frightening circumstances."[6]

Part II outlines a five-step scenario-planning framework worth considering when developing proposals for a Clean Energy Scenario Planning Framework. Some of these steps are iterative: What planners learn in one step will cause them to circle back to a previous step or sub-step.

The Framework should address who participates in the scenario planning, the timeline, and the frequency of the planning cycle. Part III below addresses who should participate in the process. As for timeline, one real-world consideration is to make the planning cycle occur frequently enough so that the Commission meets its once-every-five years statutory responsibility to report to the legislature on the status of and need for changes to the Renewable Portfolio Standards. There are likely other factors affecting the appropriate timing. There will likely be different framework definitions and designs, producing different timing of planning activities. We suggest, therefore, that the parties should propose specific planning cycles based on their individual proposed frameworks.

A. Step 1 - Define the question facing the decisionmakers

The CESP process should ask questions broad enough to avoid focusing on a single outcome (e.g., should HECO build an interisland transmission cable?), but focused enough to empower decisionmakers to solve the problems they face. A better question is ***"What actions must Hawaii take to be prepared, under a variety of potential futures, to supply its energy service needs cleanly, reliably, and at reasonable cost?"*** This phrasing emphasizes that clean energy, reliable service, and reasonable cost are constant objectives under all scenarios. This might not be the only or best question, an issue to be determined through the CESP framework when established. A no-regrets scenario analysis would require—and thus ensure—the achievement of all three. The chosen house will accommodate triplets, mobility changes, and a newly located job.

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[6] *Why Scenarios?*, Professor Heinrich Vogel Global Business Network.

B. Step 2 - Define the starting point for developing alternative scenarios

With the question defined, the next step is to identify a starting point for describing alternative scenarios. The collection of clean energy goals set forth in Hawaii statutes and orders can contribute to defining that starting point. Appendix A summarizes most of these existing goals. Also contributing to the starting point are a range of load forecasts, current cost recovery processes approved by the Commission, and current rate designs. The results of renewable energy zone[7] studies or locational value maps[8] can also be part of the starting point.

The legislation allows for changes to some of the prescribed standards. The PUC has the authority to revise the Renewable Portfolio Standard (RPS) and the authority to amend the Energy Efficiency Portfolio Standard (EEPS). The Commission is also responsible for setting interim EEPS goals. The scenario construction needs to address the possibility of these changes.

C. Step 3 - Explore the unexpected, identify key drivers, and develop scenarios

Scenario planning requires more than keeping current on events likely to affect Hawaii's regulated energy sector, such as expected changes in technology or legislation. Planners also must make assumptions about the unexpected. Exploring the unexpected is what identifies the key driver. At the crux of meaningful scenarios are key drivers discovered through exploration and research. Drivers are not predetermined trends. Drivers are uncertainties that make a difference in the scenarios and to policy and resource decisions. Listed below are sample uncertainties, designed to help Hawaii's Clean Energy Scenario planners get started.

- Solar power will be competitive with wind power by 2020.
- Policy changes and technological breakthroughs (e.g., gasoline tax increases, federal and state tax credits for the purchase of electric vehicles) will make electric cars competitive with internal combustion engines.
- There will be a federal tax placed on all carbon-based fuels, regardless of end use, based upon maximum potential carbon emissions.
- The federal government will impose strict new regulations on the production and consumption of biofuels.

These examples of uncertainties are not forecasts, but rather plausible, thought-provoking views of what the future might hold. The scenario-planning process could dismiss any of these uncertainties as implausible or as insufficiently different from expected futures.

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[7] A ***renewable energy zone*** is an area that the utility has identified as containing significant renewable energy potential.

[8] A ***locational value map*** identifies geographic areas of load growth at the distribution system level where energy efficiency and distributed generation could be beneficial.

D. Step 4 - Assess potential actions, make decisions

Scenario planning is not an academic exercise. The goal is to empower the decisionmakers to make choices that are "regret-free." Rather than searching for the least-cost solution on a particular case, as with IRP, the CESP framework looks for recurring resource or policy responses that produce favorable results in all or most of the plausible scenarios.

Assume that the CESP process identified two drivers as most important: (a) whether electric vehicles become economic and feasible, due to technological breakthroughs; and (b) whether wind energy remains at its current prices or becomes markedly less expensive due to an enormous federal tax credit. These two drivers produce four scenarios. Now assume that of those four resulting scenarios, an interisland cable is attractive only in the scenario that includes the wind tax credit and excludes electric cars (assume this scenario to be the IRP case). Now also assume that a smart grid proved beneficial in all four scenarios. In this hypothetical case, the decisionmakers would be less excited about the interisland cable but would look seriously at smart grid.

The scenario development process does not stop there. The attractiveness of the smart grid in all scenarios should cause the utility and the Commission to look at smart grid enhancements such as advanced metering infrastructure, and then at rate designs that depend on that sophisticated metering. In this example, study of the four scenarios might also cause the Commission to consider refining RPS and EEPS standards, along with the budget for the Public Benefits Fee Administrator.

In short, a meaningful CESP framework will help participants navigate through a planning process that will allow decisionmakers to make informed judgments about what actions provide favorable results under a broad range of scenarios.

The framework must describe how and by whom decisions are made throughout the process. Decision processes must be transparent and efficient. The framework must not allow important policy decisions to be decided by default.

E. Step 5 – Monitor conditions

Uncertainties change over time. New technologies that were not even part of the plausible scenarios become commercial. Environmental and tax rules change. Political or economic sea changes occur. Old uncertainties become predetermined paths. These fact changes require scenario changes. Scenario planning therefore requires monitoring and reassessment of scenarios and planned actions.

III. Who Are the Appropriate Participants in a CESP Process?

The Commission's September 23, 2009 order asked questions about the role of the public benefits fee administrator in the CESP and about how changes to the IRP process reflect differences between electric cooperatives and investor-owned utilities. This section more broadly addresses the issue of participation in the CESP. The Public Benefits Fee Administrator

(the PBF administrator) is responsible for designing and implementing energy-efficiency programs in the HECO Companies service territories (See Appendix B for the statutory basis). The utility remains responsible for rate design and direct load control programs. Act 155 identifies two other entities whose responsibilities indicate that they are candidates for involvement with the CESP process. There is an Energy Resources Coordinator, responsible for (a) identifying certain geographic areas where renewable energy resources are attractive, (b) identifying potential transmission projects, (c) recommending special purpose bonds, and (d) recommending incentives for renewable resources within certain renewable energy zones. Act 155 also creates a Renewable Energy Facilitator who facilitates the efficient permitting of renewable energy projects.

Each of these three entities is responsible for designing and implementing parts of the state's clean energy initiative. Their responsibilities make them unique contributors to building facts about the status of current plans, and injecting ideas about the future. They are indispensable contributors to each of the five steps described in Part II. There are others: U.S. DOE experts, utility experts, resource developers, community groups, and economic development experts. In short, the framework process should involve more than the customary players; it should identify and involve all those whose responsibilities require them to imagine outcomes, and whose responsibilities are likely to affect outcomes. With this diversity of participants, a neutral facilitator seems necessary.

What happens at one electric utility might affect the long-term plans of other electric utilities. This interdependency requires the inclusion of all of Hawaii's electric utilities in the CESP, even if the Commission needs to adjust the CESP framework to accommodate differences between investor-owned electric companies and electric cooperatives. Gas-electric interaction requires the involvement of the gas utility as well. If a scenario is defined by an abundance of gas, planners would find attractive such strategies as switching electric end-uses to gas, or using peak-load gas-fired generation to supplement intermittent renewable resources.

Water and sewage utilities regulated by the Commission should be part of the CESP process. Water treatment and delivery require electricity. Wasted water increases the use of electricity. Customers often heat water with nonrenewable energy sources. The efficient use of hot water is another potential contributor to Hawaii's clean energy future.

IV. Next Steps

We recommend that the Commission invite the parties to this investigation to consider the purpose of scenario planning and its differences from traditional IRP. Parties may comment on this paper by November 20, 2009. The parties' comments on this paper should address whether the uncertainties facing Hawaii's clean energy future warrant the use of scenario planning, as distinct from using the traditional integrated resource planning approach or an integrated planning approach constrained by clean energy mandates. In their FSOPs (due by December 21, 2009), we recommend that the parties address the attached questions.

Appendix A: Partial List of Mandates for Inclusion in a "Starting Point"

To develop CESP scenarios, parties should establish a common starting point that reflects all the mandates set forth below, along with any others that appear from time to time.

1. **Renewable Portfolio Standard (Act 155)**

   - Renewable resources shall comprise 10% of electric generation by 2010 and grow to 40% by 2030 in prescribed increments.
   - After 2014, energy efficiency and customer-sited renewable energy no longer count as renewable resources for RPS compliance.
   - Starting in 2013 and every five years thereafter, the PUC will review these standards and report its findings to the legislature the following year.
   - The PUC may also establish set-asides within the renewable portfolio for certain technologies.

2. **Energy Efficiency Portfolio Standard (Act 155)**

   - Targets a reduction in electricity usage of 4,300 GWh by 2030 (the legislation is ambiguous as to the baseline for this reduction).
   - The PUC is responsible for establishing interim goals for 2015, 2020, and 2025.
   - The PUC may adjust the 2030 target and may establish incentives and penalties.

3. **Renewable Energy Acquisition Mechanisms**

   Electric utilities must accept renewable energy through the following mechanisms, in addition to any bilaterally negotiated contracts:

   - Avoided cost rate under the Public Utilities Regulatory Policies Act of 1978.
   - Net energy metering for systems of up to 100 kW and up to 3% of utility peak load on the HELCO and MECO systems and 1% for HECO, as amended by the Public Utilities Commission in Docket No. 2006-0084 (2009).
   - The Competitive Bidding Framework for renewable energy projects of 5 MW or larger for HECO and 2.75 MW for HELCO and MECO, as approved by the Public Utilities Commission in 2006.
   - A feed-in tariff as defined by the Public Utilities Commission in Docket No. 2008-0273 (2009).

4. **Electric Car Development (Act 156)**

- Public parking lots with at least 100 spaces by 2011 must reserve 1% of their spaces as designated for electric vehicles and equip them with recharging devices, increasing this percentage to 2% when Hawaii has 5,000 electric vehicles.

- The definition of an electric utility does not include any person who owns, controls, operates, or manages plants or facilities primarily used to charge or discharge a vehicle battery that provides power for vehicle propulsion.

- Beginning in 2010, state and county vehicle acquisitions must give preference to electric vehicles and other energy-efficient vehicles.

5. **Greenhouse Gas Reduction (Act 234)**

- By January 1, 2020, the State of Hawaii shall reduce statewide greenhouse gas emissions to levels at or below the best estimations and updates of the inventory of greenhouse gas emissions estimates for 1990.

- The Hawaii Department of Health is responsible for setting administrative rules to achieve the emissions limit.

- No later than December 2009, a Greenhouse Emissions Reduction Taskforce within the Department of Business and Economic Development and Tourism and composed of government, business, and academic persons shall provide a "work plan" and a "regulatory scheme," which shall outline the most effective ways to reduce emissions.

- By December 2011, there will be emissions rules and fees established.

6. **Solar Water Heaters (Act 204 as amended by Act 155) and Solar Tax Credits (Act 155)**

- New single-family homes must include solar water heaters.

- Residential photovoltaic state tax credits of up to $5,000 per system.

7. **Hawaii Clean Energy Initiative**

- The Hawaii Clean Energy Initiative sets the goal that 70% of all of Hawaii's energy needs (not just electricity) shall come from clean energy sources. Act 155 mentions this goal.

Appendix B: Summary of Legislatively Mandated Positions

Public Benefits Fee Administrator (Act 234)

1. The PUC, by order or rule, may require that all or a portion of the moneys collected by Hawaii's electric utilities from its ratepayers through a demand-side management surcharge be transferred to a third-party administrator for purposes of demand-side management and energy efficiency programs.

2. The PUC designated a Public Benefits Fee Administrator.

Energy Resources Coordinator (Act 155): Responsibilities include:

1. Evaluating energy conservation and efficiency programs and formulating new plans;

2. Assisting public and private agencies in implementing energy conservation and efficiency programs, the development of indigenous energy resources, and related measures;

3. Coordinating with state and federal energy programs;

4. Assisting private entities and public agencies with developing and implementing energy conservation or renewable energy programs;

5. Crafting a process for identifying geographic areas where renewable energy is attractive;

6. Developing and recommending incentives, plans, and programs to encourage the development of renewable energy in such areas;

7. Identifying potential critical transmission projects; and

8. Recommending special purpose bonds and incentives for renewable resources within certain renewable energy zones.

Renewable Energy Facilitator (Act 155): Responsibilities include:

1. Facilitating the efficient permitting of renewable energy projects and their accompanying transmission facilities and other infrastructure; and

2. Initiating the implementation of key renewable energy projects by permitting various efficiency improvement strategies identified by the department.

Appendix C - Questions to Ask About the Proposed Frameworks

Listed below are questions posed throughout this paper. We suggest that the parties address these questions as part of their FSOP. While the questions are designed for yes/no answers, they will produce more insights if they stimulate more detailed responses.

1. Does the proposed framework provide a reasonable process for defining the question(s) that the CESP must answer?

2. Does the proposed framework enable the Commission to meet its statutory requirements regarding the review and establishment of RPS and EEPS targets?

3. Does the proposed framework provide a reasonable process for defining a starting point for scenario planning?

4. Does the proposed framework provide a reasonable process for discovering a plausible range of uncertainties and trends?

5. Does the proposed framework differentiate between uncertainties and predetermined trends?

6. Does the proposed framework provide a reasonable process for identifying the drivers of uncertainty that make a difference?

7. Does the proposed framework provide a reasonable process for defining a reasonable number of scenarios that define a plausible range of different futures for planning decisions?

8. Does the proposed framework enable the Commission to make timely and informed decisions about the budget for the Public Benefits Fee Administrator?

9. Does the proposed framework provide a reasonable process for assessing actions and making decisions?

10. Does the proposed framework provide a reasonable process for ongoing monitoring and adjustments to approved plans?

11. Does the proposed framework create an efficient, transparent process that involves all relevant decisionmaking entities?

12. Does the proposed timeline provide adequate time for the participants to address effectively each step of the framework?

13. Does the proposed frequency of scenario-planning cycles allow the Commission to meet its related statutory responsibilities efficiently?